

**Fishery Management Report No. 22-22**

---

---

**Fishery Management Report for Sport Fisheries in the  
Northwest/North Slope Management Area, 2021**

by

**Brendan Scanlon**

October 2022

---

---

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	°
<b>Weights and measures (English)</b>		Company	Co.	degrees of freedom	df
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	expected value	$E$
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	≥
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	≤
ounce	oz	exempli gratia (for example)	e.g.	logarithm (natural)	ln
pound	lb	Federal Information Code	FIC	logarithm (base 10)	log
quart	qt	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
yard	yd	latitude or longitude	lat or long	minute (angular)	'
		monetary symbols (U.S.)	\$, ¢	not significant	NS
<b>Time and temperature</b>		months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	$H_0$
day	d	registered trademark	®	percent	%
degrees Celsius	°C	trademark	™	probability	P
degrees Fahrenheit	°F	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
degrees kelvin	K	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
hour	h	U.S.C.	United States Code	second (angular)	"
minute	min	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
second	s			standard error	SE
<b>Physics and chemistry</b>				variance	
all atomic symbols				population sample	Var
alternating current	AC			sample	var
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

***FISHERY MANAGEMENT REPORT NO. 22-22***

**FISHERY MANAGEMENT REPORT FOR SPORT FISHERIES IN THE  
NORTHWEST/NORTH SLOPE MANAGEMENT AREA, 2021**

by

Brendan Scanlon

Alaska Department of Fish and Game, Division of Sport Fish, Fairbanks

Alaska Department of Fish and Game  
Division of Sport Fish, Research and Technical Services  
333 Raspberry Road, Anchorage, Alaska, 99518-1565

October 2022

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.adfg.alaska.gov/sf/publications/>. This publication has undergone regional peer review.

Product names used in this publication are included for completeness and do not constitute product endorsement. The Alaska Department of Fish and Game does not endorse or recommend any specific company or their products.

*Brendan Scanlon,  
Alaska Department of Fish and Game, Division of Sport Fish,  
1300 College Road, Fairbanks, AK 99701-1599, USA*

*This document should be cited as follows:*

*Scanlon, B. 2022. Fishery management report for sport fisheries in the Northwest/North Slope Management Area, 2021. Alaska Department of Fish and Game, Fishery Management Report No. 22-22, Anchorage.*

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

**If you believe you have been discriminated against in any program, activity, or facility please write:**

ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK 99811-5526

U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA 22203

Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW MS 5230, Washington DC 20240

**The department's ADA Coordinator can be reached via phone at the following numbers:**

(VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648,

(Juneau TDD) 907-465-3646, or (FAX) 907-465-6078

**For information on alternative formats and questions on this publication, please contact:**

ADF&G Division of Sport Fish, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907) 267-2375

# TABLE OF CONTENTS

LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES .....	ii
ABSTRACT .....	1
EXECUTIVE SUMMARY .....	1
INTRODUCTION.....	1
SECTION I: MANAGEMENT AREA OVERVIEW .....	2
Management Area Description.....	2
Fishery Resources.....	3
Commercial Fisheries .....	3
Subsistence Fisheries.....	3
Established Management Plans and Policies .....	4
Major Issues.....	4
Sport Fishing Effort, harvest, and Catch.....	5
SECTION II: FISHERIES.....	6
Seward Peninsula/Norton Sound Arctic Grayling .....	7
Fishery description.....	7
Fishery Management Objectives.....	8
Recent Fishery Performance .....	9
Current Issues and Fishery Outlook.....	9
Current or Recommended Research and Management Activities.....	10
ACKNOWLEDGMENTS .....	10
REFERENCES CITED .....	11
TABLES AND FIGURES.....	13
APPENDIX A: CROSS REFERENCING BOARD OF FISHERIES INFORMATION .....	25

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1. Sport fishing effort by major fisheries and subareas in the Northwest/North Slope Management Area, 2007–2021.....	14
2. Sport fish harvest by species in the Northwest/North Slope Management Area, 2007–2021. ....	15
3. Sport fish catch by species in the Northwest/North Slope Management Area, 2007–2021. ....	16
4. Arctic grayling sport harvest and catch in Seward Peninsula/Norton Sound rivers, 2007–2021. ....	17

## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1. Map of the sport fish regions in Alaska and the 5 Region III management areas. ....	18
2. The Seward Peninsula/Norton Sound subarea.....	19
3. Major drainages of Southern Norton Sound.....	20
4. Southern Seward Peninsula with road-accessible waters. ....	21
5. Kotzebue Sound/Chukchi Sea subarea.....	22
6. North Slope subarea. ....	23

## LIST OF APPENDICES

<b>Appendix</b>	<b>Page</b>
A1. References to information specific to 2023 Alaska Board of Fisheries proposals. ....	26

## **ABSTRACT**

Information specific to sport fisheries in the Northwest/North Slope Management Area in 2021 and information for 2022 is presented. Estimates of fishing effort, total harvest and catch are summarized through the 2021 season. This information is provided to the Alaska Board of Fisheries, as well as to the general public and interested parties. Major fisheries within the area are detailed, including descriptions of the performance of these fisheries, regulatory actions by Alaska Board of Fisheries, social and biological issues, and descriptions of ongoing research and management activities.

Keywords: Northwest/North Slope Management Area, Nome River, Snake River, Pilgrim River, Fish River, Niukluk River, Solomon River, Arctic grayling, sport fisheries, sport fishery management, subsistence fisheries, fisheries management plans

## **EXECUTIVE SUMMARY**

This document provides information specific to the sport fishing opportunities that exist within the Northwest and North Slope Management Area (NW/NSMA). Information specific to the proposal that the Alaska Board of Fisheries (BOF) will address at its January 2023 meeting are contained within this report. To assist BOF members in acquiring information in a timely manner, Appendix A has been constructed. This table guides the reader to specific information contained within the text, tables, and figures that will be useful in evaluating regulatory proposals.

## **INTRODUCTION**

This report provides information for the NW/NSMA and is one in a series of reports annually updating fisheries management information within Region III (Figure 1). The report is provided for the BOF, Fish and Game Advisory Committees (ACs), the general public, and other interested parties. It presents a description of area fisheries; summary of the fisheries effort, harvest, and catch; fisheries assessment information; and the management strategies that are developed from that information.

The mission of the Division of Sport Fish of the Alaska Department of Fish and Game (ADF&G) is to protect and improve the state's fishery resources. This is achieved by managing for sustainable yield of wild stocks of sport fish, providing diverse sport fishing opportunities, and providing information to assist the BOF in optimizing social and economic benefits from sport fisheries. In order to implement these goals, the division has in place a fisheries management process.

A regional review is conducted annually, during which the status of important area fisheries is considered, and research needs are identified. Fisheries stock assessment and research projects are developed, scheduled, and implemented to meet information needs identified by fisheries managers. Projects are planned within a formal operational planning process. Biological information gathered from these research projects is combined with effort information and input from user groups to assess the need for and development of fisheries management plans and to propose regulatory strategies.

Division of Sport Fish management and research activities are funded by Fish and Game and Federal Aid in Fisheries Restoration funds. Fish and Game funds are derived from the sale of state sport fishing licenses. Federal Aid funds are derived from federal taxes on fishing tackle and equipment established by the Federal Aid in Sport Fish Restoration Act (also referred to as the Dingell-Johnson Act or D-J Act). D-J funds are provided to the states at a match of up to 3-to-1 with the Fish and Game funds. Additional funding specified for providing, protecting, and managing access to fish and game is provided through a tax on boat gas and equipment established

by the Wallop-Breaux (W-B) Act. Other peripheral funding sources may include contracts with various government agencies and the private sector, or in a few cases, State of Alaska general funds (GF).

This area management report provides information regarding the NW/NSMA and its fisheries for 2021, with information, if available, from the 2022 season. This report is organized into two primary sections: (1) a management area overview including a description of the management area with a summary of effort, harvest, and catch for the area (based on data from the SWHS); and (2) an overview of the significant area fisheries, including specific harvest and catch by species and geographical region or drainage.

Sport fishing effort and harvest of sport fish species in Alaska have been estimated and reported annually since 1977 using a mail survey. The Alaska Sport Fishing Survey (commonly referred to as the Statewide Harvest Survey [SWHS]) is designed to provide estimates of effort, harvest, and catch on a site-by-site basis. It is not designed to provide estimates of effort directed towards a single species. Species-specific catch-per-unit-effort (CPUE) information can seldom be derived from the survey data. A questionnaire is mailed to a stratified random sample of households containing at least one individual with a valid fishing license (resident or nonresident). Currently, information gathered from the survey includes participation (number of anglers and days fished), number of fish caught and harvested by species and site for guided and unguided fishing. These surveys estimate the number of angler-days of fishing effort expended by sport anglers fishing Alaska waters as well as the sport harvest. Survey results for each year are not available until the following year; hence, the results for 2021 were not available until fall 2022. Additionally, creel surveys have been selectively used to verify the mail survey for fisheries of interest or for fisheries that require more detailed information or inseason management.

The utility of SWHS estimates depends on the number of responses received for a given site (Mills and Howe 1992). In general, estimates from smaller fisheries with low participation are less precise than those of larger fisheries with high participation for estimates from 1977 to 1990. Therefore, the following guidelines were implemented for evaluating survey data:

1. Estimates based on fewer than 12 responses should not be used other than to document that sport fishing occurred.
2. Estimates based on 12 to 29 responses can be useful in indicating relative orders of magnitude and for assessing long-term trends.
3. Estimates based on 30 or more responses are generally representative of levels of fishing effort, catch, and harvest.

More recently, SWHS estimates were compared to onsite creel surveys for estimates from 1996 to 2006 and using coefficient of variation (CV) of harvest estimates was recommended to determine precision of estimates (Clark 2009). CVs of harvest estimates from the SWHS should be 0.30 or less before using the estimates for evaluating long term trends and CVs of 0.20 or less before use in stock assessments.

## **SECTION I: MANAGEMENT AREA OVERVIEW**

### **MANAGEMENT AREA DESCRIPTION**

The NW/NSMA includes all waters north of the Yukon River drainage in Norton Sound, the Seward Peninsula, Kotzebue Sound (including the major drainages of the Kobuk and Noatak

Rivers), and all north-draining waters of the Brooks Range east to the Canadian border (Figures 2–6). The total land area consists of approximately 147,992 mi<sup>2</sup> (383,301 km<sup>2</sup>). Located within the NW/NSMA are the communities of Utqiavik (formerly Barrow), Point Hope, Kivalina, Noatak, Kotzebue, Noorvik, Kiana, Ambler, Shungnak, Kobuk, Selawik, Buckland, Deering, Shishmaref, Nome, Teller, Brevig Mission, White Mountain, Golovin, Elim, Koyuk, Shaktoolik, Unalakleet, St. Michael, and Stebbins. Access to most of the communities and water bodies is limited to aircraft or boat. Three roads emanating from Nome provide access to surrounding communities and drainages; Teller (Nome-Teller Highway), the Kuzitrin River drainage (Nome-Taylor Highway), and Council (Nome-Council Road; Niukluk-Fish River drainages). Many streams located along the southern half of the Seward Peninsula between Koyuk and Teller (Figure 4), including the Fish, Niukluk, Eldorado, Nome, Snake, Sinuk, Feather, Tisuk, Pilgrim, and Kuzitrin Rivers, are accessible via the Nome road system.

## **FISHERY RESOURCES**

Fish species present in the NW/NSMA include anadromous Dolly Varden *Salvelinus malma*; Chinook *Oncorhynchus tshawytscha*, coho *O. kisutch*, chum *O. keta*, sockeye *O. nerka*, and pink salmon *O. gorbuscha*; Bering cisco *Coregonus laurettae*; broad whitefish *C. nasus*; and humpback whitefish *C. pidschian*. Also present are freshwater-resident Arctic grayling *Thymallus arcticus*, Dolly Varden, Arctic char *S. alpinus*, northern pike *Esox lucius*, inconnu/sheefish *Stenodus leucichthys*, round whitefish *Prosopium cylindraceum*, least cisco *C. sardinella*, humpback whitefish, broad whitefish, burbot *Lota lota*, and lake trout *S. namaycush*.

### **Commercial Fisheries**

Although small when compared to the major commercial fisheries in southeast and southwest Alaska, the commercial fisheries in Northwest Alaska form an economic base for income and employment in many local communities. Commercial harvests of salmon, herring, halibut, and crab are usually much larger than sport harvests for those species (except on the North Slope, where currently there are no commercial fisheries for salmon, and consequently, all references to commercial fisheries in this report refer to those in Norton and Kotzebue Sounds). In addition, extremely limited commercial fisheries exist for freshwater species such as sheefish, Dolly Varden, and whitefish.

### **Subsistence Fisheries**

Approximately 28,000 people live in the NW/NSMA (U.S. Census Bureau 2020). Except for the 2 larger communities of Nome and Kotzebue, the population is scattered among 31 small villages along the coast and the major area rivers. Most of the population is composed of Alaska Natives, many of whom rely heavily on the subsistence use of fish and wildlife for their livelihoods in a mixed market–subsistence economy. Although personal-use fisheries are also allowed, there has been no participation in these fisheries in the NW/NSMA, largely because all Alaska residents qualify as subsistence users. Subsistence harvests of salmon, Dolly Varden, sheefish, whitefish, and crab are very important to the livelihood of the many small villages in the NW/NSMA and are much larger than the sport fish harvests, which generally make up the smallest component of overall use in most years.

## ESTABLISHED MANAGEMENT PLANS AND POLICIES

Regulations governing fisheries in the NW/NSMA are found in 5 AAC 69.101 through 5 AAC 69.995 (North Slope Area sport fishing) and 5 AAC 70.001 through 5 AAC 70.995 (Northwestern Area sport fishing), and in 5 AAC 01.100 through 5 AAC 01.190 (subsistence fishing).

Fisheries-specific management objectives for the management area have been identified in management plans for Arctic grayling and lake trout. In addition, a series of general divisional criteria have been prepared to guide establishment of fishery objectives, including the following:

- **Management and protection of existing fish resources.** Divisional activities should strive to manage and protect Alaska’s wild fish stock resources for future generations.
- **Public use and benefits of existing fish resources.** Alaska’s fishery resources should be made available for public use and benefit on a sustained yield basis.
- **Rehabilitation of depressed stocks and damaged habitat.** Division activities should strive to restore and maintain fish stocks and habitat damaged by human activities.
- **Enhancement of natural production or creation of new opportunities.** The division should pursue creation of new sport fishing opportunities through rehabilitation of natural stocks or creation of new fisheries where these opportunities do not negatively impact other fisheries.

The *Wild Arctic Grayling Management Plan* (5 AAC 69.155; 5 AAC 70.055) directs ADF&G to manage wild Arctic grayling populations in the NW/NSMA for long-term sustained yield through a conservative harvest regime. The plan establishes and defines 3 management approaches under which ADF&G shall manage wild Arctic grayling populations in the NW/NSMA: (1) the regional management approach; (2) the conservative management approach; and (3) the special management approach. The plan also outlines guidelines and considerations for ADF&G, the public, and the BOF to change or address the management approach for a water body or fish stock.

## MAJOR ISSUES

1. *Nome area gold mining.* The future development of large-scale lode deposits of gold near Nome has the potential to degrade fish habitat in the Snake, Cripple, Nome, and Solomon River drainages. Recently, a large increase in the number of recreational suction-dredging operations has occurred in the nearshore marine waters of the Nome Subdistrict, generating concerns over turbidity plumes and conflicts with subsistence fishers. Interest in mining is directly related to the world price of gold. Although the price of gold peaked in 2011 at nearly \$2,000/oz, prices have remained high enough in the years following ( $\geq$ \$1,500/oz in 2021) to keep mining interest high in the Nome area.
2. *Rural resentment of sport fishing and sport anglers.* At public meetings in this area, local residents sometimes express resentment toward “outsiders” who come into remote areas traditionally used by local people for subsistence hunting or fishing. They explain that there is a cultural proscription against the concept of sport fishing in that people do not have the right to “play” with food resources. This point of view can be particularly strong toward catch-and-release practices and has led to some resentment directed toward sport anglers who wish to fish in remote waters of

NW/NSMA, and to proposals before the BOF that would have eliminated catch-and-release in some fisheries.

## **SPORT FISHING EFFORT, HARVEST, AND CATCH**

Effort, harvest, and catch statistics for NW/NSMA sport fisheries have been estimated from responses to the SWHS since 1977 and reported under the headings of Seward Peninsula–Norton Sound Drainages (Area W), Northwest Alaska Drainages (Area X), and North Slope Drainages (Area Z; <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>). The results of the SWHS indicate that effort in the NW/NSMA has remained relatively stable since 2010. During 2016–2020, total sport fishing effort for the NW/NSMA averaged 17,170 angler-days, slightly above the prior 5-year (2011–2015) average of 16,323 (Table 1). In 2021, the number of angler-days in the NW/NSMA was 15,468, which was below the recent 10-year average of 16,892 angler-days (Table 1).

The Seward Peninsula and Norton Sound subarea supports most of the sport fishing effort in the NW/NSMA. Effort there has averaged 9,666 angler-days (56% of the area total) for the years 2016–2020 (Table 1). Rivers supporting the most sport fishing effort in the NW/NSMA have been the Unalakleet, Fish/Niukluk, and Nome Rivers. The Nome River has been closed to directed fishing for Arctic grayling and chum salmon since the early 1990s (although sport fishing for chum salmon reopened in 2013), and it is likely that these closures contributed to a reduction of fishing effort on this stream. Annual effort in the Nome River averaged 2,641 angler-days for 2016–2020, composing 27% of the total effort for the subarea (Table 1), and is primarily directed at pink and coho salmon. The Fish/Niukluk River system has sustained an annual average of 492 angler-days for 2016–2020. Estimated effort on the Snake and Sinuk Rivers has averaged about 778 and 357 angler-days respectively for 2016–2020 (Table 1).

In the Kotzebue/Chukchi Sea subarea, sport fishing effort has been somewhat more variable, ranging from about 1,900 to 11,300 angler-days per year during 2011–2020 (Table 1). In 2021, there were an estimated 3,108 angler-days in the subarea, well below recent 5- and 10-year averages (Table 1). Part of the large decrease in angler-days in the Kotzebue/Chukchi Sea subarea may be attributed to the adoption by the BOF in 2016 of a proposal expanding the area in which hook and line attached to a rod or pole is legal subsistence gear within the Kotzebue District (Kotzebue District is the Division of Commercial Fisheries definition of the area encompassing the Kotzebue/Chukchi Sea subarea, and is the definition of the area used by the Division of Sport Fish), and added the term “rod and reel” to the lawful subsistence gear in the proposed expanded area of the Kotzebue District. This regulation made it unnecessary for resident anglers to purchase sport fishing licenses if they want to use sport fishing gear in the Kotzebue/Chukchi Sea subarea. The large drainages of the Kobuk and Noatak Rivers support more than 75% of the freshwater effort in this subarea during most years, and the remainder is dispersed among smaller drainages such as the Wulik, Kivalina, and Selawik Rivers, and many of the area’s lakes. Expense of travel, difficulty of access, and small human population probably account for the low levels of sport fishing effort reported in this region.

In the North Slope subarea, sport fishing effort is generally light but variable, with much of the effort focused on Dolly Varden, Arctic char, lake trout, and Arctic grayling in streams and lakes along the Dalton Highway (North Slope Haul Road) where access is less difficult. The average effort during 2016–2020 was 2,356 angler-days, with more than 65% of that coming from Haul

Road fisheries (Table 1). In 2021, sport fishing effort was 2,219 angler-days with almost 50% of the effort directed at Haul Road fisheries.

Harvests of Pacific salmon in 2021 were well below the recent 5- and 10-year averages (Table 2). Catches of Pacific salmon in 2021 were also below recent averages (Table 3). Salmon harvest in 2021 was 5,860 fish, well below the recent 10-year average of 10,314 fish, with coho salmon harvest composing 66% of the harvest in 2021 (Table 2). Catches of Pacific salmon in the NW/NSMA in 2021 were 8,399 fish, well below the recent 10-year average of 24,939 (Table 3). Much of the fluctuation in salmon catches and harvests in the NW/NSMA can be attributed to the size of the pink salmon runs, which can vary dramatically from year to year throughout Norton Sound. More recently, travel to rural areas was greatly restricted in 2020 and 2021 due to concerns over COVID-19 transmission from nonlocal visitors, which greatly reduced nonresident and guided fishing opportunity. Harvest and catch of Dolly Varden in 2021 were also below recent averages. Harvest of Dolly Varden in 2021 was 1,653 fish compared to the recent 10-year average of 2,104 fish. Harvest of Arctic grayling in 2021 was 1,089 fish, close to the recent 10-year average of 1,336 fish (Table 2). Catches of both Dolly Varden and Arctic grayling in 2021 fell from recent 10-year averages. Catches of Dolly Varden were 6,933 in 2021 compared to recent 10-year averages of 8,111 fish and catches of Arctic grayling in 2021 were 8,615 fish compared to the recent 10-year average of 11,420 fish (Table 3).

Harvest and catch of lake trout, sheefish, burbot, whitefish, and northern pike were all below 10-year averages, with no lake trout, northern pike, whitefish, or burbot catches reported in 2021 (Tables 2 and 3). More detailed descriptions of specific important fisheries by location and species can be found in *Section II: Fisheries*.

## **SECTION II: FISHERIES**

NW/NSMA waters offer some of the most remote and diverse angling opportunities available in Alaska. Opportunities to fish for Dolly Varden, sheefish, and Arctic grayling in pristine areas without encountering other anglers are widespread. Angling opportunities for salmon, especially chum, pink, and coho salmon, are not as well-known but can be excellent. Marine sport fisheries have been virtually nonexistent throughout the area, although in Norton Sound, anglers occasionally try trolling for salmon (Chinook, coho, and pink) on calm days. The proportion of angler-days spent fishing in saltwater is generally less than 5% of the total annual areawide effort. Jigging through the ice for saffron cod, smelt, flounder, sheefish, Arctic grayling, and Dolly Varden is common near coastal settlements, but these fisheries generally operate under subsistence fishing regulations.

This section provides a summary of the Arctic grayling sport fishery in the NW/NSMA that pertains to Proposal 75. Discussion of the fishery will address (1) fishery description, (2) fishery management objectives, (3) recent fishery performance, and (4) research and management activities. Recent fishery performance will focus on data from 2021. Information regarding the 2022 season were included where available, but estimates of sport effort, catch, and harvest are not yet available for the 2022 season.

## SEWARD PENINSULA/NORTON SOUND ARCTIC GRAYLING

### Fishery description

Sport fisheries for Arctic grayling in the NW/NSMA are relatively small when compared to the remainder of the Arctic-Yukon-Kuskokwim Region, with average annual harvests of 376 fish in the Seward Peninsula/Norton Sound subarea for the years 2016–2020 (Table 4). Catches averaged 2,250 fish in the Seward Peninsula/Norton Sound subarea, indicating that most Arctic grayling captured in these fisheries are released. Even though the harvests are relatively small, Arctic grayling are normally the 3rd or 4th most commonly harvested species in the Seward Peninsula/Norton Sound subarea.

The Seward Peninsula has long been known for its production of large Arctic grayling, with approximately 15% of all trophy-sized Arctic grayling registered with ADF&G's Trophy Fish Program. However, many populations are quite small, and because they often inhabit small streams, they must be managed as independent stocks with regulations tailored to the individual populations (or groups of similarly structured populations) to prevent overexploitation.

Since 1989, the stock status of Arctic grayling populations in several rivers where sport fishing occurs on the Seward Peninsula has been monitored (DeCicco 1990, 1991, 1992a, 1992b, 1993, 1994–1999, 2002, 2004, 2007; DeCicco and Gryska 2007; DeCicco and Wallendorf 2000; Gryska 2004, 2006, 2015, 2016, 2019; Gryska and Taras 2007; Joy 2006; Viavant 2014). The Nome River stock was found to be overexploited, whereas the current levels of harvest on the Niukluk, Fish, Pilgrim, Snake, and Sinuk Rivers populations are believed to be sustainable. The Solomon River was found to have a very low Arctic grayling population and was closed to fishing for Arctic grayling in 1992.

Arctic grayling densities in most Seward Peninsula rivers are low. They generally range from about 40 to 60 fish per mile in the Nome and Sinuk Rivers to about 200 fish per mile in the Pilgrim River. Densities in the Niukluk and Fish Rivers are higher at about 470 and about 500 fish per mile, respectively (DeCicco 2002; Viavant 2014). In contrast, Interior Alaska Arctic grayling populations often exceed 500 fish per mile (Ridder et al. 1993; Ridder 2000). Arctic grayling from rivers on the Seward Peninsula are large in general and are generally older and larger when they first spawn than Arctic grayling in Interior Alaska streams. Arctic grayling from the Snake River were found to be 50% mature at 307 mm fork length (FL) and 99% mature at 404 mm FL (DeCicco and Gryska 2007). Arctic grayling from Northwestern Alaska can live for more than 20 years, and 1 fish from the Eldorado River was determined to be approximately 29 years old using otolith analysis. Some Arctic grayling may survive to grow very large, particularly in rivers where fishing effort is light. For example, in the lightly exploited Sinuk River, almost 70% of the 2003 sample was age-8 or older, and the average total length of all fish sampled was over 457 mm (Joy 2006).

Prior to 1988, the bag limit for Arctic grayling in the NW/NSMA was 15 fish, only 2 of which could be 20 inches or larger. In 1988, the BOF established a separate bag and possession limit for Arctic grayling in Northern Norton Sound of 5 per day, with only 1 fish 15 inches or longer. The effect of this change is reflected in harvest estimates that averaged about 4,300 Arctic grayling annually for the years 1980–1988 but dropped to about 1,550 from 1990 to 2000. This regulatory change probably contributed to the near doubling of the Arctic grayling populations in the Fish and Niukluk Rivers when compared to estimates from the early 1990s (Gryska and Taras 2007; Viavant 2014; Gryska 2016).

## **Fishery Management Objectives**

Research on status of resident Arctic grayling populations in the rivers accessible from the road system in Northern Norton Sound has been ongoing for approximately 20 years. Arctic grayling in Northwestern Alaska may live for more than 20 years and attain a large size. Data collection on population abundance, age, and size composition by river throughout this period has allowed the development of regulations tailored to individual rivers or groups of rivers that share population characteristics. Overall management objectives for these Arctic grayling populations are to maintain a given abundance of fish  $\geq 15$  inches in length, and to allow for population recovery in systems that have been stressed by overexploitation. The areawide bag and possession limits are 5 fish per day, with only 1 fish 15 inches or longer. This bag limit is appropriate for drainages with Arctic grayling populations that have characteristics of lightly exploited populations. These characteristics include large average size and a high proportion of sexually mature fish that are 7 years of age or older in the population. Abundance is directly related to the river's size and flow characteristics; therefore, both abundance and population density may vary by river. Rivers that share these characteristics and regulations include the Fish/Niukluk River system and the Eldorado and Sinuk Rivers. On the other extreme are overexploited populations where abundance is very low. Rivers like the Nome and Solomon are in this category and are consequently closed to all fish for Arctic grayling.

Populations that intermediate between these 2 categories include those in the Pilgrim and Snake Rivers. These populations contain a smaller proportion of sexually mature fish. They have been affected somewhat by harvest, but Arctic grayling are still relatively abundant, and populations appear stable. In these rivers, the regulations allow harvest of 2 Arctic grayling per day, with only 1 fish 15 inches or longer. Populations are assessed periodically to estimate whether they are maintaining desired characteristics. Recent stock assessments of Arctic grayling populations in road-accessible waters suggest that the current management approach is working, and that population size and size compositions are being sustained.

Management objectives have not been developed for remote Arctic grayling waters of the remainder of the Seward Peninsula or the Kotzebue subarea. Anglers rarely visit these waters, and populations are presumed to be unexploited. General regulations for these waters provide for a bag and possession limit of 5 fish, with no size limit. Until effort and harvests increase dramatically, it is likely that these regulations will remain unchanged.

In 2004, the *Wild Arctic Grayling Management Plan* was adopted. The plan created 3 management approaches with associated regulatory options: regional, conservative, and special management. The regulations adopted under the regional management approach (5-fish bag and possession limit, season open year-round) did change the general Arctic grayling regulations in the NW/NSMA from 10 to 5 fish (with the exceptions of the Dalton Highway Corridor, Northern Norton Sound, and the Unalakleet River drainage, which already had bag limits of 5 fish), and those fisheries classified under the conservative and special management approach. The Snake and Pilgrim Rivers are classified under the conservative management approach, and the Nome and Solomon Rivers are classified under special management. No actions were taken specific to NW/NSMA Arctic grayling fisheries at either the 2016 or 2019 BOF meetings.

## **Recent Fishery Performance**

Estimated harvests of Arctic grayling by sport anglers in the Seward Peninsula/Norton Sound subarea have declined since 1991 when harvest peaked at 5,121 fish. During 2016–2020, harvests averaged 376 fish per year (Table 14).

The estimated catch of Arctic grayling fluctuates greatly from year to year, ranging from approximately 600 to 8,000 fish during the past 10 years; however, catch was 3,531 fish in 2021, close to the recent 5-year average of 3,722 fish. Catch-and-release appears to be a prevalent practice in the Seward Peninsula/Norton Sound subarea because the proportion of Arctic grayling catch that was harvested was only 16% during 2016–2020.

Current exploitation rates on most Northwestern Alaska Arctic grayling populations are unknown in part due to a lack of harvest information on Arctic grayling in subsistence fisheries, but also because most are in remote areas, exploitation is believed to be low. Some estimates of exploitation by the sport fishery in Nome-area roadside streams are available by combining harvest data with abundance data. Based on this information, exploitation rates of Arctic grayling were estimated to range from 10% to 20% in some streams during the early 1990s. More recent estimates for the Niukluk and Fish Rivers suggest that annual exploitation in these streams has been less than 5% over the past 10 years. In addition, guided anglers have caught over 21,000 grayling in the Seward Peninsula/Norton Sound subarea during 2006–2016 but harvested just 87 fish (Powers and Sigurdsson 2016; B. Powers, ADF&G Division of Sport Fish, Logbook Program, unpublished data). These data suggest a change in angler motivation away from harvest as a primary reason for fishing.

## **Current Issues and Fishery Outlook**

There is concern on the part of the public and ADF&G staff that populations of Arctic grayling in the vicinity of Nome that are road accessible, especially the Nome and Solomon Rivers, have been overexploited and may not recover for many years. The abundance of fish  $\geq 15$  inches has been depressed since at least 1990 (DeCicco 2007). An experimental restoration project in 1998 to increase survival of young-of-the-year Arctic grayling by rearing them in a gravel pit failed (DeCicco 2004). Additional restoration efforts were conducted more recently using a different rearing pond, and in 2002 and 2003, a total of 1,574 pen-reared Arctic grayling were released into the Nome River. The population was reassessed in 2005 to estimate the abundance and contribution of pen-reared fish into the Nome River. Although the number of small fish captured was insufficient to estimate abundance, more were captured than in past assessments, indicating that there may be an increase in smaller Arctic grayling in this river. By 2009, it was believed that these fish should be large enough to be recruited to the sampling gear for a stock assessment to estimate abundance. In June 2009, catches were so low that sample sizes were not met in order to estimate abundance. Other road-accessible populations would be vulnerable to overexploitation if fishing practices and motivations were to change; however, at this time, other populations appear to be stable and are able to sustain the current low levels of catch and harvest.

Northwestern Alaska, particularly waters of the Seward Peninsula, provides some of the best opportunities in the state to capture large (e.g.,  $>18$  in) Arctic grayling. Under the current regulations, it appears that these trophy fisheries are being maintained. Populations in the Fish and Niukluk Rivers have recovered from relatively low levels of abundance in the early 1990s, and the outlook in these rivers is promising. Populations in both the Pilgrim and Sinuk Rivers are slightly

larger than when last assessed and appear to be sustaining current levels of exploitation, and the population in the Pilgrim River appears stable.

### **Current or Recommended Research and Management Activities**

In 2013, a stock assessment project was conducted to estimate abundance of Arctic grayling in a 14 mi (22 km) index area of the Niukluk River from the outlet of the Casadepaga River to the village of Council. Using mark–recapture techniques, 10,715 fish (SE = 1,369)  $\geq 350$  mm FL were estimated in this index area (Gryska 2016), well above the desired minimum abundance of 3,500 fish  $\geq 350$  mm FL for this index area. A similar assessment project was conducted on the Snake River in 2016 in a 9 mi (14 km) index area, and an estimated 809 fish (SE = 161)  $\geq 350$  mm FL were estimated in this index area (Gryska 2019), above the desired minimum abundance of 600 fish  $\geq 350$  mm FL for this index area. In 2018, a stock assessment project was conducted to estimate abundance of Arctic grayling in a 25 mi (40 km) index area of the Sinuk River. However, catch rates were too low during the first event to warrant a second event and the project was discontinued. Low catch rates were likely due to the large number of pink salmon (over 1,000,000) in the river at that time and not due to low abundance of Arctic grayling.

In 2021, a stock assessment project was conducted in attempt to estimate abundance of Arctic grayling in a 25 mi (40 km) index area of the Nome River. Due to the inability to achieve the desired sample size of 105 fish during the marking event, the decision was made to discontinue the project. The population has clearly failed to recover to an abundance that can support a catch-and-release fishery or minimal harvest, and the result of closing the fishery in 1992 has not had the desired effect of allowing the population to recover. Although it is not known what the potential size of a healthy Nome River Arctic grayling population was before the closure, an average of 600 Arctic grayling/year were harvested from the Nome River from 1983 to 1991 (Mills 1992), suggesting that there were several thousand fish there in the past that were large enough to be caught using sportfishing gear. Based on the abundance and density of Arctic grayling populations in other Seward Peninsula roadside streams, it is believed that the Nome River once supported a population of up to 5,000 Arctic grayling  $\geq 350$  mm FL (DeCicco 2004).

The ability of a population to grow at low abundances is determined by its ability to recover from disturbances (in this case, overharvest in the sport fishery), and at some low threshold, the population may be too low to recover; a phenomenon known as the Allee effect (Stephenson et al. 1999). It appears likely that the Nome River Arctic grayling population has reached this chronically low level. In the absence of a comprehensive rehabilitation program whereupon Arctic grayling from a nearby donor population can successfully be transplanted into the Nome River to increase reproduction and juvenile survival, it is likely the that the Nome River will remain closed to Arctic grayling fishing indefinitely. Although there is no precedent in Alaska for enhancement of an Arctic grayling population through the transport of adults from a neighboring wild population, if effective, it could offer a timely and cost-effective way to increase the number of mature Arctic grayling in the Nome River.

### **ACKNOWLEDGMENTS**

The author thanks Klaus Wuttig, Region III Management Coordinator, for guidance and editorial assistance; Lisa Stuby, Yukon Area Management Biologist, for peer review; and Rachael Kvapil, Region III Publications Technician, for assistance in final report preparation.

## REFERENCES CITED

- Clark, R. A. 2009. An evaluation of estimates of sport fish harvest from the Alaska statewide harvest survey, 1996-2006. Alaska Department of Fish and Game, Special Publication No. 09-12, Anchorage.
- DeCicco, A. L. 1990. Seward Peninsula Arctic grayling study 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-11, Anchorage.
- DeCicco, A. L. 1991. Seward Peninsula Arctic grayling study 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-24, Anchorage.
- DeCicco, A. L. 1992a. Assessment of Dolly Varden overwintering in selected streams of the Seward Peninsula, Alaska, during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-11, Anchorage.
- DeCicco, A. L. 1992b. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, Alaska during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-13, Anchorage.
- DeCicco, A. L. 1993. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, Alaska during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-36, Anchorage.
- DeCicco, A. L. 1994. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, Alaska during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-12, Anchorage.
- DeCicco, A. L. 1995. Assessment of selected stocks of Arctic grayling in streams and a survey of Salmon Lake, Seward Peninsula, 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-19, Anchorage.
- DeCicco, A. L. 1996. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-21, Anchorage.
- DeCicco, A. L. 1997. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-15, Anchorage.
- DeCicco, A. L. 1998. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-19, Anchorage.
- DeCicco, A. L. 1999. Niukluk River Arctic grayling stock assessment, Seward Peninsula, 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-23, Anchorage.
- DeCicco, A. L. 2002. Stock assessment of Arctic grayling in the Nome River, and age validation of Arctic grayling in the Eldorado River, Seward Peninsula, Alaska 2000. Alaska Department of Fish and Game, Fishery Data Series No. 02-01, Anchorage.
- DeCicco, A. L. 2004. Nome River Arctic grayling restoration, Seward Peninsula, Alaska 2002 and 2003. Alaska Department of Fish and Game, Fishery Data Series No. 04-05, Anchorage.
- DeCicco, A. L. 2007. Stock assessment of Arctic grayling in the Nome River, 2005. Alaska Department of Fish and Game, Fishery Data Series No. 07-76, Anchorage.
- DeCicco, A. L., and A. D. Gryska. 2007. Length and age at maturity of Arctic grayling in the Snake River during 2003. Alaska Department of Fish and Game, Fishery Data Series No. 07-18, Anchorage.
- DeCicco, A. L., and M. J. Wallendorf. 2000. Fish River Arctic grayling stock assessment, Seward Peninsula, 1999. Alaska Department of Fish and Game, Fishery Data Series No. 00-29, Anchorage.
- Gryska, A. D. 2004. Abundance and length and age composition of Arctic grayling in the Snake River, 2001. Alaska Department of Fish and Game, Fishery Data Series No. 04-15, Anchorage.
- Gryska, A. D. 2006. Abundance and length and age composition of Arctic grayling in the Pilgrim River, 2002. Alaska Department of Fish and Game, Fishery Data Series No. 06-62, Anchorage.
- Gryska, A. D. 2015. Abundance and length and age composition of Arctic grayling in the Snake River, 2011. Alaska Department of Fish and Game, Fishery Data Series No. 15-05, Anchorage.
- Gryska, A. D. 2016. Abundance and length and age composition of Arctic grayling in the Niukluk River, 2013. Alaska Department of Fish and Game, Fishery Data Series No. 16-08, Anchorage.

## REFERENCES CITED (Continued)

- Gryska, A. D. 2019. Stock assessment of Arctic grayling in the Snake River, 2016. Alaska Department of Fish and Game, Fishery Data Series No. 19-17, Anchorage.
- Gryska, A. D., and B. D. Taras. 2007. Abundance and length composition of Arctic grayling in the Niukluk River, 2005. Alaska Department of Fish and Game, Fishery Data Series No. 07-22, Anchorage.
- Joy, P. 2006. Abundance and age and length compositions of Arctic grayling in the Sinuk River, 2003. Alaska Department of Fish and Game, Fishery Data Series No. 06-63, Anchorage.
- Mills, M. J., and A. L. Howe. 1992. An evaluation of estimates of sport fish harvest from the Alaska statewide mail survey. Alaska Department of Fish and Game, Special Publication No. 92-02, Anchorage.
- Powers, B., and D. Sigurdsson. 2016. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2014. Alaska Department of Fish and Game, Fishery Data Series No. 16-02, Anchorage.
- Ridder, W. P., T. R. McKinley, and R. A. Clark. 1993. Stock assessment of Arctic grayling in the Salcha, Chatanika, and Goodpaster rivers during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-11, Anchorage.
- Ridder, W. P. 2000. Characteristics of the spring population of Arctic grayling in the Chena River in 1998 and 1999. Alaska Department of Fish and Game, Fishery Data Series No. 00-39, Anchorage.
- Stephenson, P. A., W. J. Sutherland, and R. P. Freckleton. 1999. What is the Allee effect? *Oikos* 87:185–190.
- U.S. Census Bureau. 2010. United States Census Bureau 2020 Census: Census interactive population search. <http://www.census.gov/2020census/> (accessed September 2022).
- Viavant, T. 2014. Abundance and length composition of Arctic grayling in the Fish River, 2007. Alaska Department of Fish and Game, Fishery Data Series No. 14-05, Anchorage.

## **TABLES AND FIGURES**

Table 1.–Sport fishing effort (angler-days) by major fisheries and subareas in the Northwest/North Slope Management Area , 2007–2021.

Year	Seward Peninsula/Norton Sound Subarea								Kotzebue/Chukchi Sea Sub-Area					North Slope Sub-Area			NW/NSMA
	Nome	Fish/Niukluk	Unalakleet	Snake	Sinuk	Pilgrim	Other	Total	Noatak	Kobuk	Wulik	Other	Total	Haul Road	Other	Total	Total
2007	3,887	1,483	4,205	<b>1,873</b>	933	<b>240</b>	4,979	16,667	2,935	1,627	<b>205</b>	<b>260</b>	5,027	799	3,355	4,154	25,848
2008	5,272	3,842	5,129	1,740	<b>878</b>	<b>590</b>	5,422	21,995	1,621	1,183	<b>395</b>	<b>1,222</b>	4,421	3,774	1,825	5,599	32,015
2009	2,808	3,813	5,329	564	<b>447</b>	<b>482</b>	4,004	17,000	2,561	3,283	<b>428</b>	1,159	7,431	1,813	2,092	3,905	28,336
2010	2,326	1,844	3,012	1,032	616	<b>248</b>	1,532	10,610	745	955	<b>334</b>	1,436	3,470	3,724	660	4,384	18,464
2011	<b>725</b>	4,738	3,926	<b>405</b>	<b>467</b>	<b>74</b>	1,005	11,340	3,002	<b>613</b>	<b>443</b>	<b>465</b>	4,523	1,746	1,185	2,931	18,794
2012	1,914	2,685	2,957	<b>404</b>	<b>566</b>	<b>76</b>	1,450	10,052	2,593	1,598	<b>246</b>	<b>533</b>	4,970	3,714	1,343	5,057	20,079
2013	1,093	2,345	4,747	<b>378</b>	<b>464</b>	<b>133</b>	2,277	11,437	2,336	1,303	<b>203</b>	<b>330</b>	4,175	1,415	1,615	3,030	18,642
2014	2,625	<b>767</b>	1,320	<b>583</b>	<b>126</b>	<b>198</b>	2,041	7,660	<b>426</b>	<b>2,412</b>	<b>112</b>	<b>910</b>	3,860	1,568	2,073	3,641	9,542
2015	1,915	<b>866</b>	2,299	<b>403</b>	<b>915</b>	<b>155</b>	1,027	7,580	<b>1,087</b>	<b>1,278</b>	<b>88</b>	<b>1,550</b>	4,003	1,679	1,296	2,975	14,558
2016	3,225	1,312	2,920	<b>1,784</b>	<b>215</b>	<b>961</b>	3,881	14,298	972	2,031	<b>484</b>	<b>1,077</b>	4,564	2,971	1,301	4,272	23,314
2017	2,944	<b>231</b>	3,583	<b>222</b>	<b>201</b>	<b>164</b>	<b>880</b>	8,225	<b>756</b>	<b>285</b>	<b>629</b>	<b>212</b>	1,882	1,591	<b>547</b>	2,138	12,245
2018	2,121	<b>392</b>	3,469	<b>824</b>	<b>284</b>	<b>54</b>	1,190	8,334	1,862	1,003	<b>212</b>	<b>568</b>	3,645	<b>474</b>	<b>757</b>	1,231	13,210
2019	1,380	<b>396</b>	4,189	<b>463</b>	<b>285</b>	<b>298</b>	2,097	9,108	<b>1,071</b>	<b>1,131</b>	<b>327</b>	<b>111</b>	2,640	1,288	<b>916</b>	2,204	13,952
2020	3,533	<b>129</b>	565	<b>596</b>	<b>799</b>	<b>311</b>	2,688	8,621	8,806	617	<b>545</b>	<b>1,396</b>	11,364	<b>1,384</b>	<b>552</b>	1,936	13,952
2021	2,657	<b>813</b>	1,887	<b>1,309</b>	<b>750</b>	<b>56</b>	2,669	10,141	<b>1,435</b>	<b>999</b>	<b>318</b>	<b>356</b>	3,108	1,054	1,165	2,219	15,468
2011–2020 Average	2,148	1,386	2,998	606	432	242	1,854	9,666	2,291	1,227	329	715	4,563	1,783	1,159	2,942	17,170
2016–2020 Average	2,641	492	2,945	778	357	358	2,147	9,717	2,693	1,013	439	673	4,819	1,542	815	2,356	16,892

Source: Alaska Sport Fishing Survey database [Internet]. 1996–. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 26, 2022). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>.

Note: Although data are presented for all years, data in bold result from fewer than 12 respondents and are subject to high variance and as presented only indicate that sport fishing occurred in these waters.

Table 2.—Sport fish harvest by species in the Northwest/North Slope Management Area , 2007–2021.

Year	Chinook salmon	Coho salmon	Pink salmon	Chum salmon	Sockeye salmon	Total salmon	Dolly Varden/ Arctic char	Lake trout	Arctic grayling	Northern pike	Whitefish	Sheefish	Burbot
2007	293	6,939	1,631	723	72	9,658	5,883	7	1,735	585	1,147	1,066	0
2008	594	11,927	7,567	2,954	209	23,251	4,523	0	2,181	566	307	61	130
2009	291	6,579	1,305	652	0	8,827	5,747	63	4,604	582	418	946	6
2010	61	5,876	2,712	865	0	9,514	2,551	129	1,206	595	398	595	18
2011	61	3,593	566	764	58	5,042	5,254	0	2,204	148	20	385	134
2012	0	5,099	3,220	691	28	9,038	1,627	237	2,038	781	204	104	0
2013	19	7,367	1,806	2,980	44	12,416	2,537	21	2,002	550	408	218	0
2014	0	3,378	4,603	990	0	8,971	948	101	653	171	0	244	0
2015	0	3,720	1,623	1,687	271	7,301	919	114	1,132	439	20	1,191	38
2016	78	5,554	8,565	815	83	15,095	3,696	108	2,168	125	47	667	20
2017	13	5,944	962	553	184	7,656	1,717	0	733	0	0	46	0
2018	0	7,781	1,966	725	19	10,491	1,228	8	927	59	0	298	0
2019	155	6,942	2,365	132	220	9,814	719	124	683	325	35	55	0
2020	0	3,231	3,388	1,804	93	8,516	2,398	213	818	625	933	251	310
2021	129	3,890	1,738	103	0	5,860	1,653	0	1,089	742	249	31	0
2011–2020 Average	33	5,281	2,906	1,114	100	9,434	2,104	92	1,336	322	167	316	50
2016–2020 Average	49	5,890	3,449	806	120	10,314	1,952	89	1,066	227	203	204	66

Source: Alaska Sport Fishing Survey database [Internet]. 1996–. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 26, 2022). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>.

Table 3.—Sport fish catch by species in the Northwest/North Slope Management Area , 2007–2021.

Year	Chinook salmon	Coho salmon	Pink salmon	Chum salmon	Sockeye salmon	Total salmon	Dolly Varden/ Arctic Char	Lake trout	Arctic grayling	Northern pike	Whitefish	Sheefish	Burbot
2007	1,034	13,449	6,854	6,841	116	28,294	18,535	322	22,153	16,578	1,543	1,639	105
2008	823	28,338	39,416	10,513	446	79,536	25,512	21	23,145	3,508	1,346	482	188
2009	623	17,338	8,197	5,379	112	31,649	25,465	184	30,878	3,061	1,226	5,050	6
2010	99	14,245	8,244	3,743	0	26,331	12,845	258	23,318	3,228	1,621	2,928	43
2011	574	12,042	3,134	6,098	72	21,920	17,283	0	12,675	691	555	647	142
2012	17	9,430	7,062	4,442	28	20,979	11,890	428	25,459	5,481	363	265	0
2013	203	10,357	4,147	6,971	44	21,722	8,843	542	15,303	1,486	674	569	0
2014	0	6,030	8,780	5,344	0	20,154	6,522	613	6,698	647	66	1,214	202
2015	41	6,995	5,869	4,521	299	17,725	5,117	971	12,338	760	29	2,248	38
2016	118	13,474	26,550	3,404	98	43,644	11,555	1,190	10,931	1,055	501	2,033	20
2017	369	12,659	7,283	2,520	457	23,288	6,736	0	8,573	0	0	158	0
2018	20	20,353	5,457	2,357	19	28,206	6,304	48	3,800	155	0	1,432	0
2019	155	21,215	10,492	3,641	531	36,034	9,144	670	9,764	770	8	414	0
2020	33	4,354	6,091	5,117	125	15,720	6,818	340	8,656	3,346	1,119	830	310
2021	155	4,429	3,383	432	0	8,399	6,933	18	8,615	1,219	257	2,534	0
2011–2020 Average	153	11,691	8,487	4,442	167	24,939	9,021	480	11,420	1,439	332	981	71
2016–2020 Average	139	14,411	11,175	3,408	246	29,378	8,111	450	8,345	1,065	326	973	66

Source: Alaska Sport Fishing Survey database [Internet]. 1996–. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 26, 2022). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>.

Table 4.–Arctic grayling sport harvest and catch in Seward Peninsula/Norton Sound rivers, 2007–2021.

Year	Harvest								Total
	Nome	Pilgrim	Unalakleet	Fish-Niukluk	Sinuk	Snake	Solomon	Other	
2007	0	<b>26</b>	10	12	77	<b>141</b>	0	48	314
2008	0	<b>0</b>	346	322	<b>0</b>	34	<b>0</b>	263	965
2009	0	<b>0</b>	457	456	<b>34</b>	0	<b>0</b>	256	1,169
2010	0	<b>0</b>	148	0	68	0	<b>0</b>	16	232
2011	<b>0</b>	<b>0</b>	10	1342	<b>0</b>	<b>28</b>	<b>0</b>	18	1,398
2012	0	<b>32</b>	0	421	<b>0</b>	<b>67</b>	<b>0</b>	0	520
2013	0	<b>46</b>	80	26	<b>0</b>	<b>0</b>	<b>0</b>	0	500
2014	0	<b>0</b>	0	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	0	0
2015	0	<b>0</b>	0	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>	134	154
2016	0	<b>0</b>	129	513	<b>0</b>	<b>552</b>	<b>0</b>	21	1,215
2017	0	<b>0</b>	0	<b>0</b>	<b>0</b>	<b>39</b>	<b>0</b>	<b>327</b>	366
2018	0	<b>0</b>	0	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	143	143
2019	0	<b>0</b>	<b>0</b>	<b>122</b>	<b>39</b>	<b>0</b>	<b>0</b>	0	161
2020	0	<b>0</b>	<b>0</b>	<b>54</b>	<b>215</b>	<b>44</b>	<b>0</b>	0	313
2021	0	<b>0</b>	0	<b>0</b>	<b>180</b>	<b>0</b>	<b>0</b>	28	208
2011–2020 Average	0	0	82	278	10	69	0	126	570
2016–2020 Average	0	0	26	107	0	118	0	125	376

Year	Catch								Total
	Nome	Pilgrim	Unalakleet	Fish-Niukluk	Sinuk	Snake	Solomon	Other	
2007	61	<b>26</b>	2,375	3,287	902	<b>260</b>	0	937	7,848
2008	183	<b>13</b>	3,497	4,073	<b>84</b>	234	<b>0</b>	1,659	9,743
2009	214	<b>0</b>	4,497	6,458	<b>352</b>	364	<b>13</b>	1,724	13,257
2010	28	<b>93</b>	3,304	3,659	348	55	<b>0</b>	146	7,633
2011	<b>0</b>	<b>0</b>	1,937	2,588	<b>0</b>	<b>671</b>	<b>0</b>	18	5,214
2012	9	<b>250</b>	3,442	4,098	<b>0</b>	<b>401</b>	<b>0</b>	0	8,200
2013	0	<b>46</b>	1,264	3,502	<b>107</b>	<b>0</b>	<b>0</b>	348	5,267
2014	20	<b>80</b>	374	<b>1,230</b>	<b>0</b>	<b>0</b>	<b>96</b>	300	1,800
2015	352	<b>47</b>	157	<b>2,915</b>	<b>549</b>	<b>294</b>	<b>63</b>	1,112	7,489
2016	0	<b>21</b>	815	714	<b>9</b>	<b>552</b>	<b>0</b>	103	2,214
2017	0	<b>0</b>	738	<b>0</b>	<b>0</b>	<b>39</b>	<b>0</b>	<b>421</b>	1,198
2018	0	<b>229</b>	217	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	191	637
2019	73	<b>58</b>	785	<b>405</b>	<b>39</b>	<b>250</b>	<b>0</b>	2,581	4,191
2020	180	<b>124</b>	<b>39</b>	<b>507</b>	<b>1,578</b>	<b>143</b>	<b>110</b>	331	3,012
2021	0	<b>0</b>	<b>312</b>	<b>142</b>	<b>1,416</b>	<b>739</b>	<b>0</b>	922	3,531
2011–2020 Average	63	86	977	1,596	228	235	27	511	3,722
2016–2020 Average	51	86	519	325	325	197	22	725	2,250

Source: Alaska Sport Fishing Survey database [Internet]. 1996–. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited September 26, 2022). Available from: <http://www.adfg.alaska.gov/sf/sportfishingsurvey/>.

Note: Although data are presented for all years, data in bold result from fewer than 12 respondents and are subject to high variance and as presented only indicate that sport fishing occurred in these waters.

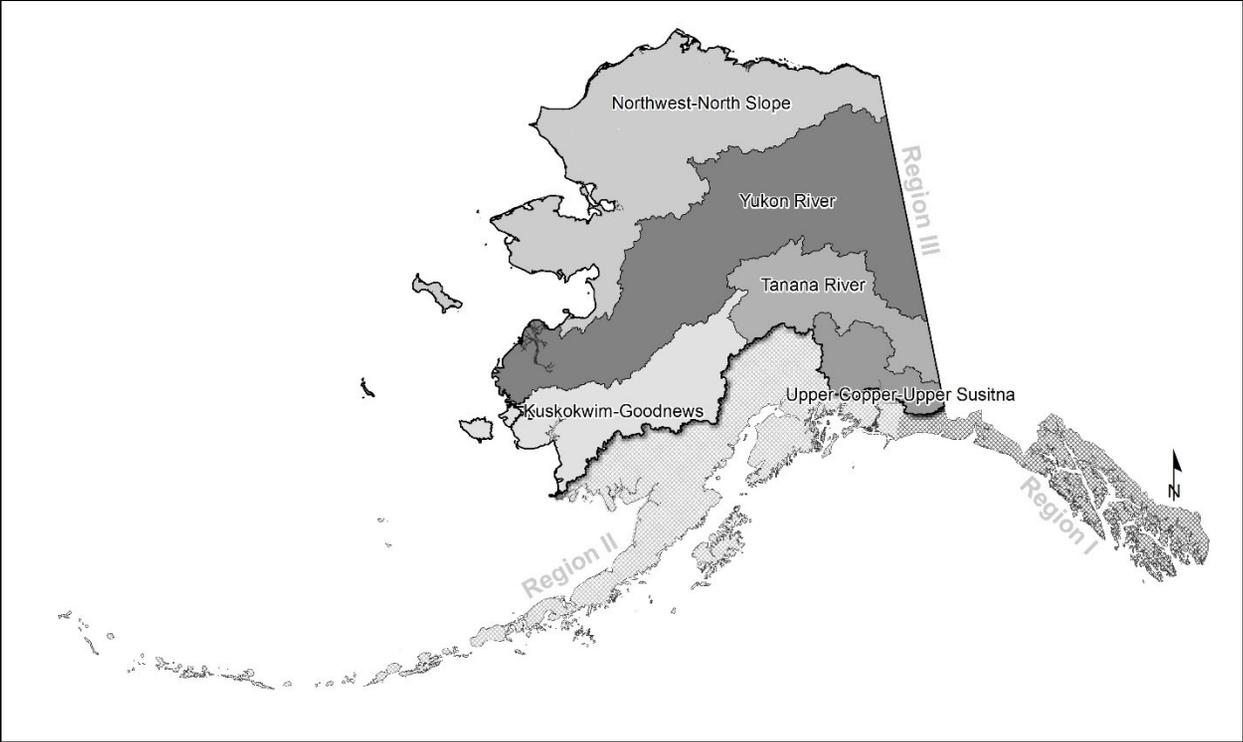


Figure 1.—Map of the sport fish regions in Alaska and the 5 Region III management areas.

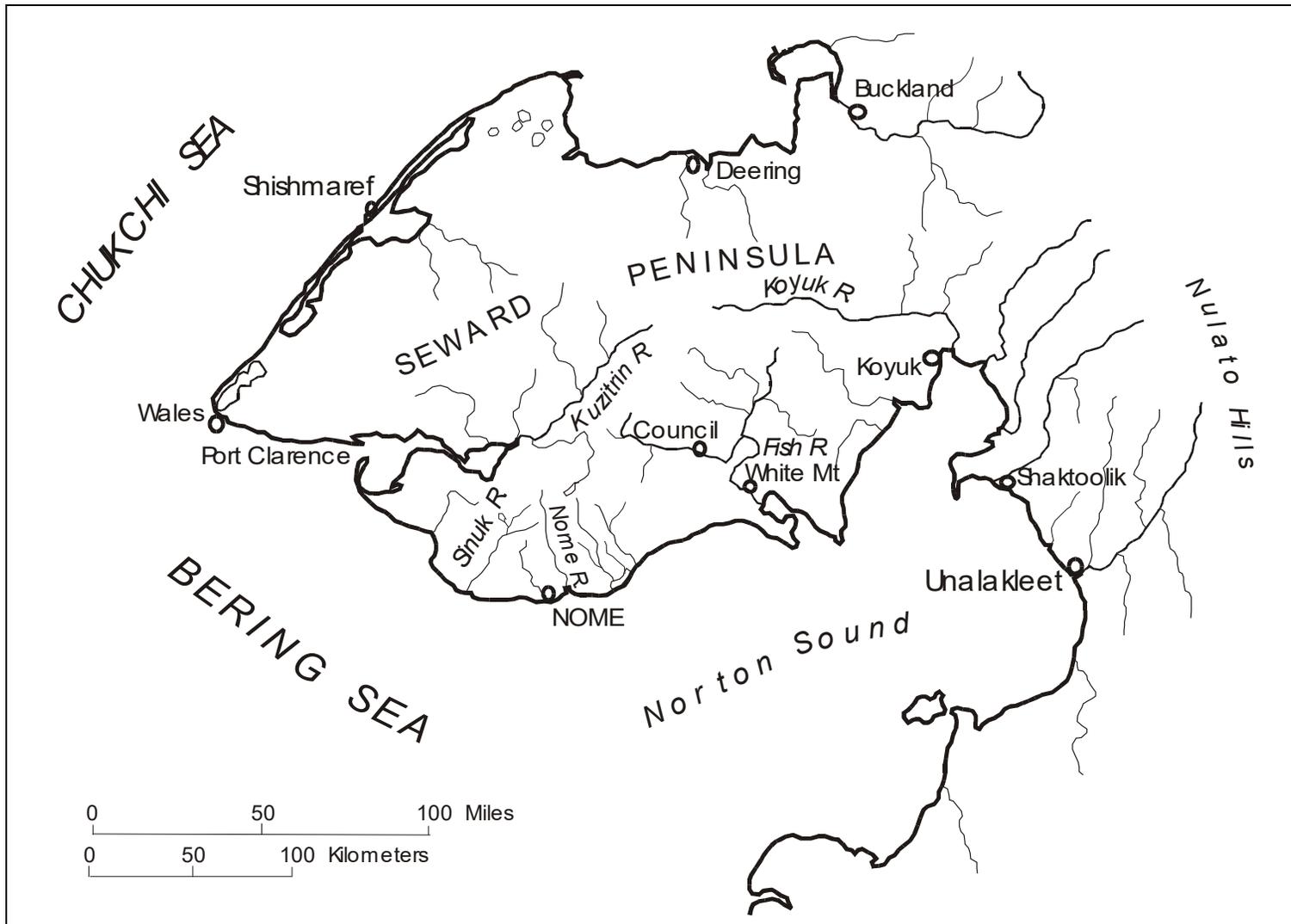


Figure 2.—The Seward Peninsula/Norton Sound subarea.

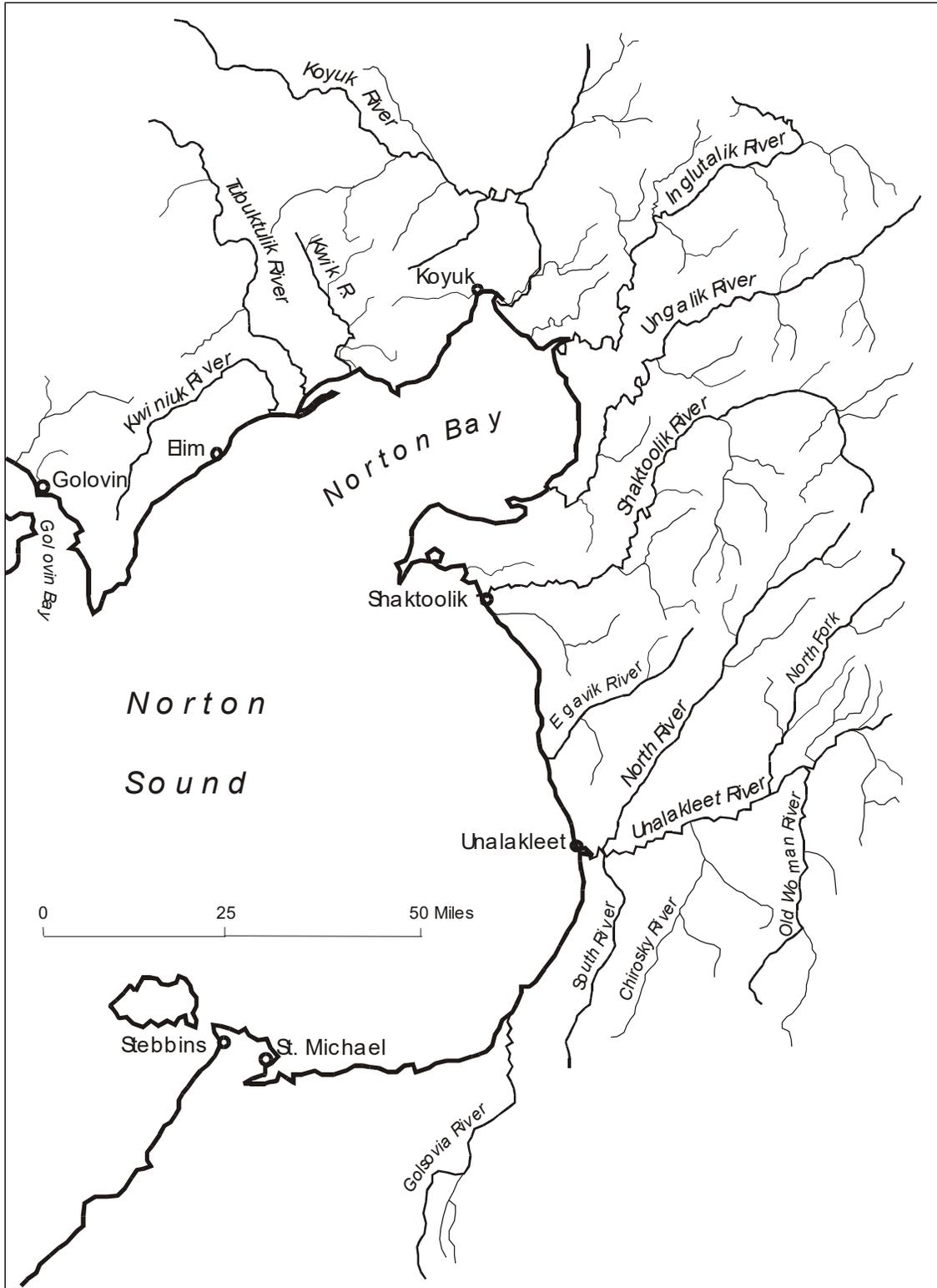


Figure 3.—Major drainages of Southern Norton Sound.

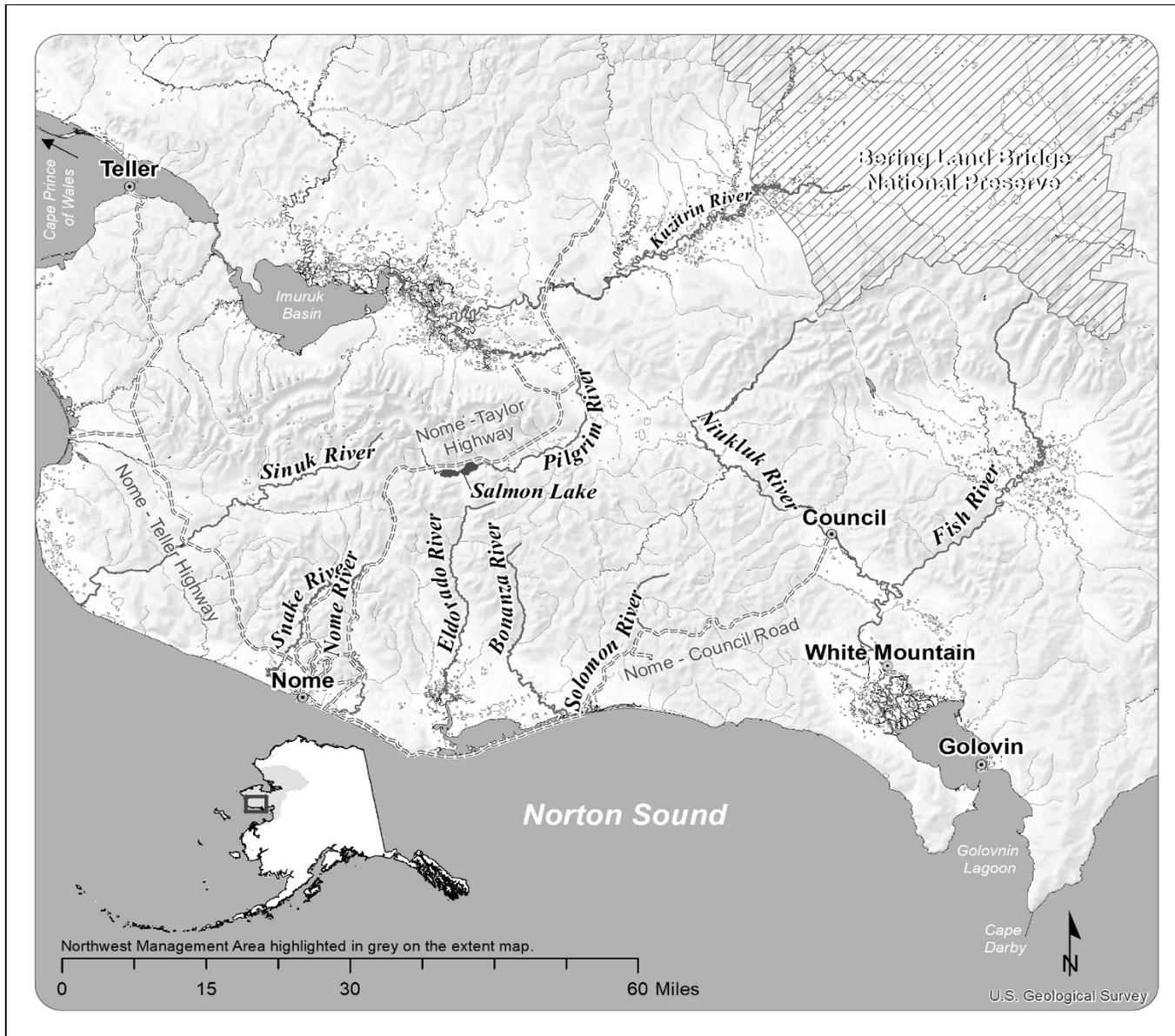


Figure 4.—Southern Seward Peninsula with road-accessible waters.

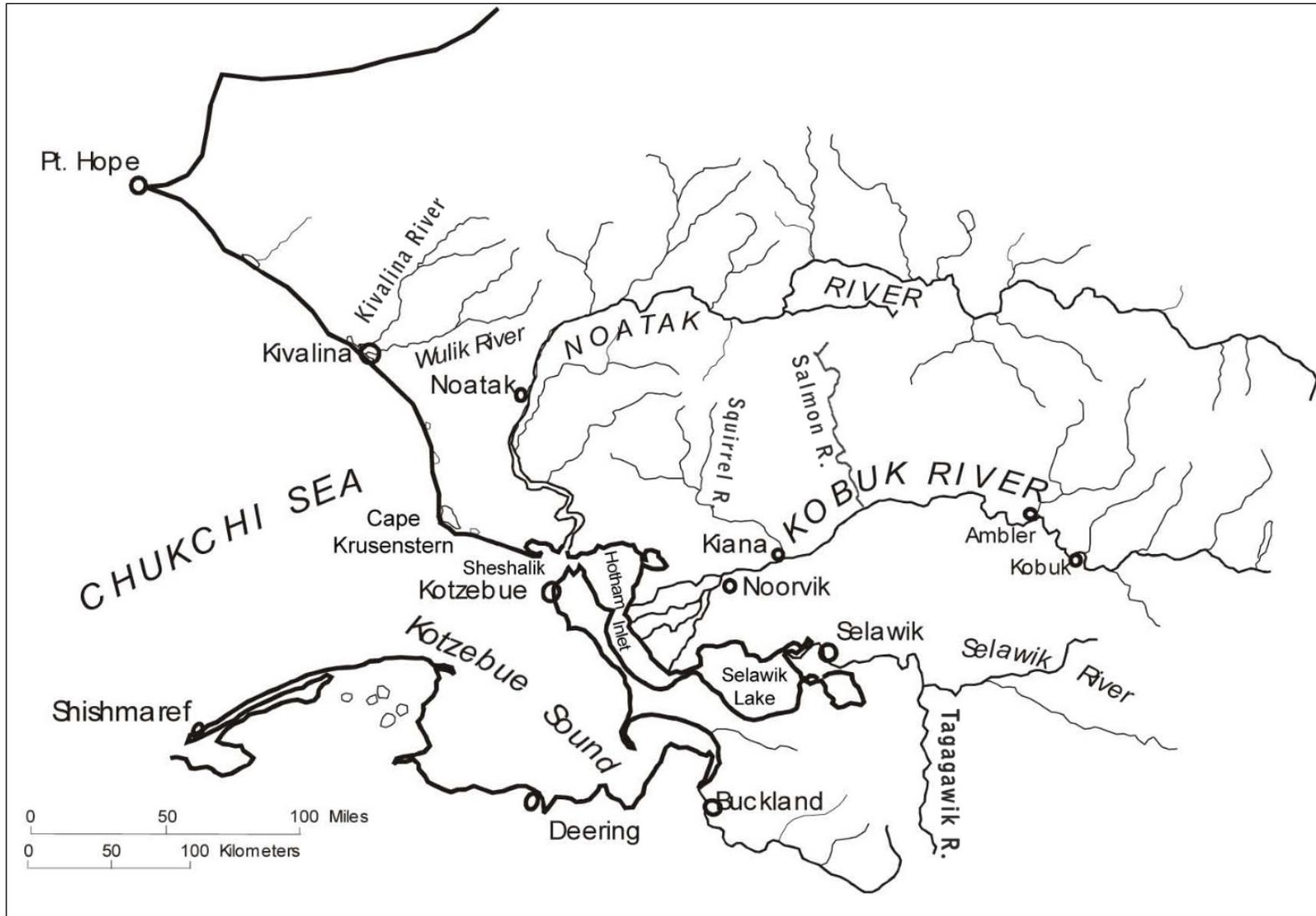


Figure 5.—Kotzebue Sound/Chukchi Sea subarea.

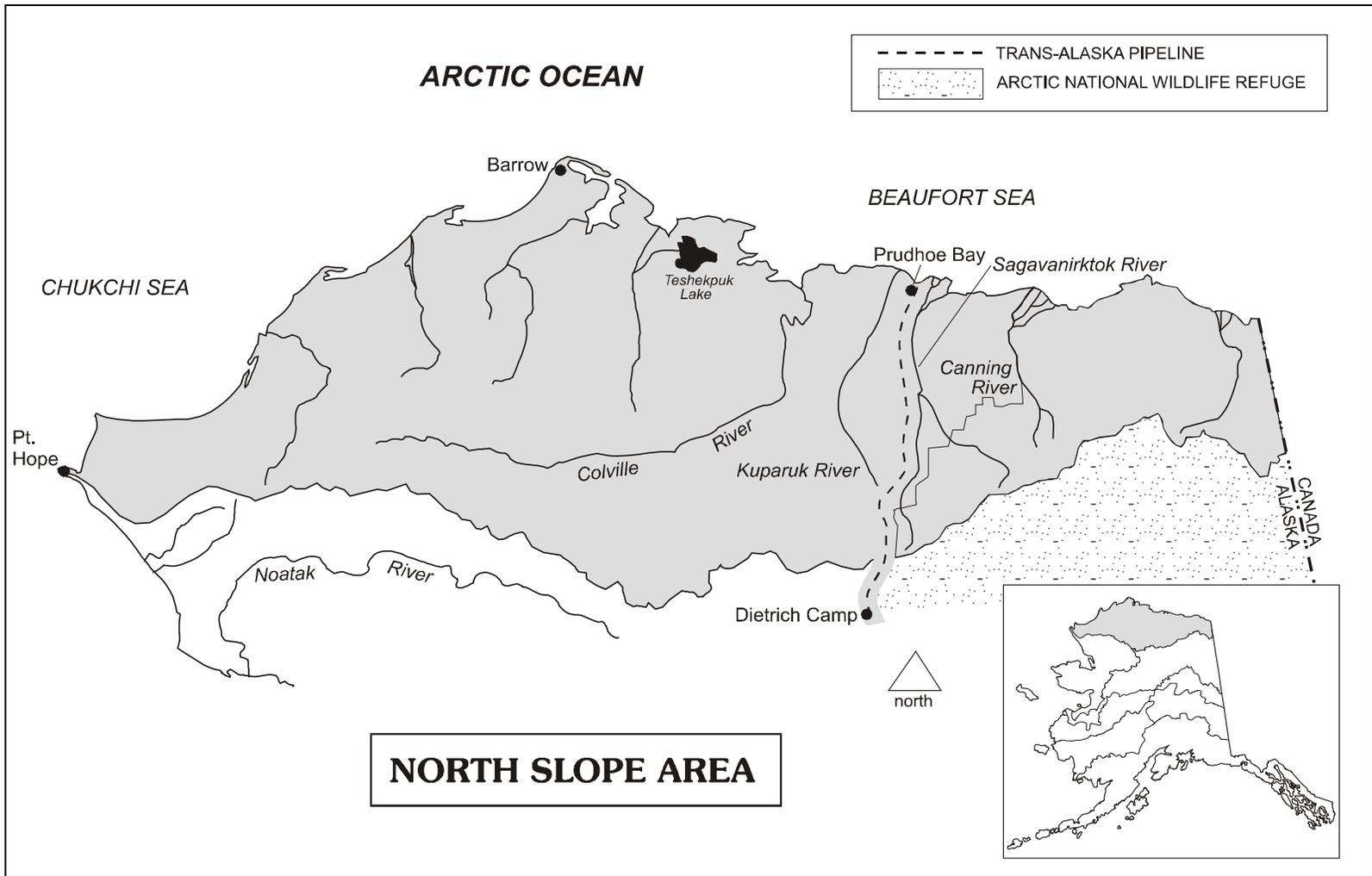


Figure 6.—North Slope subarea.



**APPENDIX A: CROSS REFERENCING BOARD OF  
FISHERIES INFORMATION**

Appendix A1.–References to information specific to 2023 Alaska Board of Fisheries proposals.

Proposal	Proposal subject	Tables	Figures
75	Modify Arctic grayling bag and possession limits in the Northwestern Area	1–4	2, 4